

Table 1-14. Mechanical properties of elastic materials

| Material | | σ_t° (σ_r°) | σ_e° | σ_{en}° max | Modulus of elasticity | | <i>F.T.</i> | ρ_r° | σ_r^0 , MYS |
|---------------------------------------|---|--|------------------|----------------------------|--|-----------------------------------|---------------|-------------------|-----------------------|
| Profile | Designation Dim. , <i>t_T</i> , load | | | | E° (E/ρ_r) $^\circ$ | G° (ν_p) $^\circ$ | | | |
| Micro- strips | Br4Sn-3Zn ** | 1.0 | 1.0 | 1.0 | 1.0 (1.0) | 1.0 (1.00) | ... | 1 | 1 |
| | Br Be 2(320)* | 1.39 | 1.25 | 2.0 | 1.2(1.2) | 1.1 (1.26) | ... | 0.96 | 1 |
| | PtAg20 | 1.74 | 2.00 | 0.5 | 1.5(0.7) | 1.5 (0.9) | ... | 2.17 | ... |
| Steel | 4340(538)* | 1.11 | 1.49 | 2.58 | 1.84 | 1.8 | ... | 0.89 | >1 |
| | 4340(204)* | 1.72 | 2.09 | 1.85 | | 1.1 (1.12) | | | |
| | 4340(427)* | 1.35 | 1.76 | 1.81 | | | | | |
| Stainless steel strips | 420 (315)* | 1.41 | 1.72 | 1.44 | 1.78 | 1.73 (0.97) | ... | 0.91 | |
| Steel wire | 0.30 mm Dia | 2.34 3.4 | 1.24 | ... | 1.06-1.8 | ... | ... | 0.89 | |
| Invar | <i>Fe-Ni36</i> | 0.40 | 0.35 | ... | 1.33 | (1.08) | ... | 0.91 | ... |
| Copper Alloys, Hard | 70Cu-30Zn | 0.46 | 0.55 | 0.56 | 1.1 | 1 | ... | 0.96 | 0.045- 0.3 |
| | 90Cu-10Zn | 0.37 | 0.47 | 0.62 | | | | | |
| | - | 0.53 | 0.51 | 0.48 | 0.96 | 0.96 | | 1 | |
| Brass- strip | 12Zn-Cu | 0.46 | 0.47 | 0.48 | 0.93 | (1.22) | ... | 0.98 | 0.045 |
| Aluminum alloys | 7075-T6 | 0.45 | 0.64 | 0.61 | 0.61 | 0.64 (1.18) | ... | 0.32 | 0.4- 0.8 |
| Titanium alloy | Ti-6Al-4V | 0.9- 1.2 | 1.13 | 1.98 | 0.96- 2.14 | 1 (1.3) | ... | 0.5 | 1-2 |
| Nitinol | <i>Ti-55Ni</i> | 0.76 | 0.26 | 1.85 | 0.90 | 0.97 | ... | 0.73 | ... |
| Carbon Whiskers | d<10 nm | 3.8 ^s - 9.2 26 [^] | ... | ... | 1.8 ^s 6.0- 9.17 ^{^^} | 9.75 (0.32- 0.79) | 9.7 | 0.15 - | ... |
| Nanotubes | S(M)WNT | 39.8 | | | 10 [^] (43) | 9(0.5) | | 0.29 | |
| Boron carbide | <i>B₄C</i> | 0.31 t/c ^s 2.58 | ... | ... | 4.1 (11.4) | (0.75) | 4.0 | 0.29 | ... |
| Silicon crystal | Si (111) (110) (100) bend | 0.17 (0.4- 10) (3.5) | 2.7- 8.9 | 0.06 | 1.68 1.15 | 1.3- 1.4 (0.79- 1.00) | 0.96- 1.65 | 0.27 | ... |
| Fused silica quartz oriented | <i>SiO₂</i> , including microfibers | 0.05 -5 t/c ^s 0.97 | 0.07 11.4 | 0.02 | 0.62- 0.95 | 0.70 (0.50- 0.64) | 0.9 | 0.26 - 0.30 | ... |
| Zerodur | | ... | ... | ... | 0.8(2.76) | (0.87) | ... | 0.29 | ... |
| Silicon carbide | SiC | 0.18 -3.5 t/c ^s | 26.7 | ... | 3.55- 3.97 11.7 [^] | 4.06 (0.58- 0.90) | 3-5.7 | 0.36 | ... |
| | SiC Whisker reinforced Al alloy 0.2 vol. | 1.25 12 [^] (5.0) | 0.37 | | | | | | |
| Silicon nitride | <i>Si₃N₄</i> Hot pressed Deposited whisker | 0.87 0.33 (5.3) 12.4 | 17.8 | ... | 1.33 up to 2.8 *** 3.4 | 2.4 (0.72- 0.97) | 1.5-8 | 0.35 | ... |



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